



DRAFT MEETING MINUTES

HANFORD ADVISORY BOARD (HAB, Board)

September 22, 2021

Virtual Meeting via Microsoft Teams

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This is only a summary of issues and actions discussed at this meeting. It may not represent the fullness of represented ideas or opinions, and it should not be used as a substitute for actual public involvement or public comment on any particular topic unless specifically identified as such.

Opening

Ruth Nicholson, HAB Facilitator, welcomed meeting participants and notified the participants that the meeting was being recorded.

Stan Branch, US Department of Energy (DOE), announced that this meeting was being held in accordance with the Federal Advisory Committee Act (FACA).

Steve Wiegman, Public at Large and HAB Chair, thanked the participants for joining. He commented that the day's meeting would be different than typical Board meetings. Due to a delay in HAB membership packet approval, he asked the Tri-Party Agreement (TPA) agencies to modify the meeting agenda to be informational only. As a result, Steve explained, the Board would not be conducting normal business—specifically, not voting on any Board actions—as important and critical members were not yet reappointed. Board decisions would be delayed to the planned October Board meeting instead. In addition, to accommodate the timing of a one-day meeting and the lapsed appointment status of members of committee leadership, there would be no committee reports at this meeting. Steve Wiegman stated that the resulting meeting would be a one-day meeting, rather than the typical two.

Ruth provided an overview of the meeting agenda. Due to the membership packet delay, it was determined that a public comment period would follow each Board topic. Steve reminded the participants that TPA agency representatives and the Board could listen to public comments but could not respond to them. As a result, he asked that commenters phrase their comments as statements for the record. Further, he noted that should it be necessary, he could rephrase comments as a question such that the question was provided by an official, currently appointed HAB member.

Tri-Party Agency (TPA) Updates

Brian Vance, DOE, was joined by Brian Stickney, DOE, in providing DOE's agency update. The presentation covered pandemic management activities, risk reduction updates, and ongoing and planned public engagement activities.

On the topic of pandemic management, Brian Vance stated that DOE would continue to work through management of the site during the pandemic. The present site workforce posture was approximately 60% reporting to on-site locations with 40% teleworking. DOE implemented a requirement for indoor mask use regardless of vaccination status at the end of July, in accordance with changes to Centers for Disease Control (CDC) guidance and in recognition of rising COVID-19 case rates in the local communities. He stated that contact tracing continued to be utilized.

Brian Vance explained that, as might be expected, various projects were impacted as a result of COVID-19 over the course of the summer. Among the impacts were supplier delays. Additionally, commodity prices were higher in general, which were impacting project costs and schedules.

He stated that the occupational medicine provider for the Hanford Site, HPM Corporation, was implementing the Washington State mandate for healthcare providers to be fully vaccinated. The federal administration provided direction on September 9 requiring all federal employees to be vaccinated by November 22, 2021. He noted that there would be exceptions granted for religious or medical requirements, but DOE was still waiting for additional guidance on implementation for the federal workforce and federal contractor employees. Both DOE and its contractors completed the vaccination attestation process to determine vaccination rates. However, that process was only recently completed and had not yet been reviewed, so the data could not be provided. It was assumed that the vaccination rates for

the Hanford Site would be consistent with the local community rates, which could be accessed through the Washington State Department of Health (DOH) website.

Brian Vance stated that DOE remained actively engaged with the efforts of the community to ensure the challenges and conditions of the community were understood and to provide community and healthcare leaders with information on site activities and operations, given their status as the largest employer in the Tri-Cities. He felt that, over the prior 18 months, DOE and its contractor team continued to lead effectively in unprecedented times while continuing to process the mission.

Brian Vance reviewed progress on the Direct-Feed Low-Activity Waste (DFLAW) project. New waste feed delivery lines from the AP Tank Farm and the Low-Activity Waste (LAW) Facility were installed. The Tank-Side Cesium Removal (TSCR) system was in place and underwent a contractor-led readiness assessment. The DOE readiness assessment would begin the following week.

Glass forming material was being delivered to the LAW facility. In mid-October, loss of power testing was planned. During this test, crews would demonstrate the ability to respond to such an event and restore power. The melters were planned for heat up later in calendar year 2021.

A replacement cover was installed over Basin 44 of the Liquid Effluent Retention Facility (LERF). It was noted as being a challenging project due to summer conditions, but the team did well in safe delivery of the project. Upgrades to equipment were underway at LERF, including upgrades to the monitoring and control systems. At the Integrated Disposal Facility (IDF), new leachate tank liners were installed.

Moving onto other risk reduction activities, Brian Vance provided a summary of project progress across the Hanford Site. Micropiling necessary for removal of the B Cell floor in the 324 Building was complete. The interim surface barrier installation at TX Tank Farm was complete. TX Tank Farm was the fourth tank farm to receive that addition.

Debris and rubble removal was completed at the Plutonium Reclamation Facility (PRF) and subsequently containerized and shipped to the Environmental Restoration Disposal Facility (ERDF). The rubble removal provided access to the soil for sampling and assessment. Complete demobilization of the Plutonium Finishing Plant demolition project was expected in November, with fieldwork completing in October. At the pump and treat facilities, approximately 2.4 billion gallons were expected to be treated in Fiscal Year (FY) 2021; FY21 would be the seventh year consecutively where over two billion gallons were treated.

Other updates Brian Vance reviewed included the AX-103 Tank retrieval, which was at approximately 65% completion. Construction of a new dry capsule storage area would soon be completed at the Waste Encapsulation and Storage Facility (WESF). The first set of capsule transfer equipment would be tested that fall by the fabricators and installed into a mockup facility.

Brian Vance then reviewed public engagement activities. DOE conducted a virtual site tour for Congressional staff members in association with Tri-City Development Council (TRIDEC), which was an effective method of bringing the staff up to speed on progress being made on the Hanford Site. Further, DOE continued to hold periodic briefings with Congressional staff members. He noted that there were several other briefings and meetings that occurred, including regular Tribal Affairs, community briefings, workshops, and others.

Brian Vance remarked that, as the Board knew, the HAB membership packet was not yet approved and that he appreciated the Board's flexibility regarding the approval process. He stated that DOE was working to educate the new administration of the significant differences between the HAB and other site-

specific advisory boards. He stated that Carrie Meyer, DOE, and her team continued to work closely with DOE Headquarters (DOE-HQ), going through rounds of questions and justifications at each level of the review.

Regarding the FY22 budget for the Hanford Site, Brian Vance stated that the House of Representatives and Senate marks were positive. Should there be a continuing resolution, Brian Vance expected that it would not impact planned projects or operations. He stated that the FY23 budget process was continuing, and DOE would provide the information it was authorized to share. Brian Vance stated that he had no insights on potential stimulus bills relative to the Hanford Site.

Brian Vance briefly discussed the B-109 tank leak, noting that there would be a presentation on the topic later in that day's meeting. Tank B-109 was a 530,000-gallon capacity single-shell tank (SST). There were 40 tanks in the B Complex, located two miles from other tank farms in 200E. The tank was stabilized many years ago, resulting in a remaining 13,000 gallons of drainable liquid sitting within saltcake. Earlier in 2021, a leak evaluation process was completed where the determination was made that the tank was leaking in the order of 1,000 to 1,500 gallons per year. When the leak determination was made, DOE communicated the news, both in a manner required and with an interest in maintaining transparency and timeliness.

Continuing his explanation, he stated that the tank is underground, with the leak effectively 40 feet beneath the surface and about 200 feet above groundwater. During previous national security operations, about 50 million gallons of waste was discharged into the soils of the B Complex, so there was already an active groundwater treatment program in operation as a result, extracting roughly six million gallons of groundwater each month. As a result, DOE felt that the leak represented zero risk to the workforce and zero risk to the public and was only an incremental insult to the contamination already in the ground in the B Complex.

Therefore, Brian Vance stated, when considering the broader site perspective and risk management obligations across the entire site, it was not logical or appropriate for DOE to reallocate resources from other projects that were delivering real risk reduction value to. Addressing B-109 offered little risk reduction value in the near term when appropriate environmental mitigation measures were already in place. Brian Vance hoped that the broader leadership perspective would prove helpful in making the later technical discussion constructive and positive.

Brian Vance stated that it was not appropriate for him to comment on the topic of presumptive care and that questions on the topic should be addressed to the Department of Justice.

In closing, Brian Vance stated that working with the HAB has proven the most valuable where it resulted in delivery of policy-level, constructive advice in the window of three to five years into the future. He understood that there were many cases where the Board felt compelled to provide opinions on emerging issues, but DOE was not always able to effectively act on near-term issues. While the three-to-five-year timeframe was helpful, beyond that point the budget cycle became more difficult to predict.

For other projects across the site, Brian Vance stated that the groundwater treatment program continued to prove effective in shrinking plumes and there were few remediation projects remaining. In the Central Plateau, the PUREX tunnels were grouted and stabilized to reduce the risk of collapse. In tank waste treatment, all projects and infrastructure, along with site operational culture, were on track for DFLAW startup in FY23. He stated that, across Hanford, DOE and its contractor team were consistently demonstrating their ability to work closely together to deliver safe and efficient cleanup program. He appreciated the support of Senators Murray and Cantwell and Congressman Newhouse in their work to

deliver federal funds to the Hanford Site and noted that those federal funds were best spent to maximize risk reduction value per dollar. He felt that DOE's work Hanford Site demonstrated its value to taxpayers while maintaining strong risk priorities and aligned its values with those of its TPA partners.

Brian Vance stated that he hoped the presentation of the Hanford Site progress was helpful and hoped the Board recognized that the Hanford Site was uniquely challenging in every respect. DOE understood that the challenges would need to be overcome and that it took its obligation to the Pacific Northwest seriously. He was optimistic of the future due to what had been accomplished together. As the site entered a new phase, DOE would continue to deliver safe and effective risk reduction projects.

Brian Vance stated that he looked forward to questions later in the program and concluded his presentation.

Roberto Armijo, US Environmental Protection Agency (EPA), provided a short update on EPA activities. EPA was continuing to maximize telework and was waiting on further guidance on vaccination requirements. There would be a briefing held with the EPA Administrator that same day, so Roberto would be absent from the later in the Board meeting for that meeting. EPA Administrator signatures on Records of Decision (RODs) and Explanations of Significant Differences were forthcoming. Concluding, Roberto stated that EPA would continue to coordinate and advance conversations with the other agencies and the Tribes.

David Bowen, Washington State Department of Ecology (Ecology), provided Ecology's update. He stated that although Ecology's offices were reopened to staff, most staff members were still reporting via telework. Offices say about a 10% increase in occupancy. Regarding the Washington State vaccine mandate, about 76% of Ecology staff had verified their vaccine status. There was an exemption process in place for religious and medical concerns. However, Ecology was anticipating personnel retirement and dismissals as a result of the mandate.

David reviewed the agency's recruitment efforts. The priorities included recruitment to fill existing vacancies, filling current "acting" positions with permanent appointees, and hiring new, "next generation" personnel that can be mentored to assure long-term success. Ecology was engaged in workforce development efforts including online job fairs and direct engagement with job seekers to educate potential future employees about job opportunities with the state. Notable positions being recruited for included Communications Manager, Toxicologist, and Permit Writer Unit Lead. New recruiters were hired to help advance the effort in filling those positions and to prepare for multiple upcoming recruitment efforts.

David announced that Ecology created a new office: the Office of Equity and Environmental Justice. This was a result of ongoing process improvements intended to attract and retain a diverse workforce, a conscious effort that included progress tracking over the prior three years. David noted that, though measurable progress was made in that effort, there was always more work to do.

As part of Ecology's outreach and education efforts, several "Let's Talk About Hanford" live events were streamed through WebEx and Facebook. Topics to date included Hanford history, "Get to know the managers," and Hanford Site wildlife. The following Tuesday, a new Hanford history event would be held. David stated that the events were well attended and supporting agencies did well in notifying the public of the events.

David felt that Brian Vance's earlier presentation laid out the B-109 tank leak situation well from a risk reduction perspective. Ecology was working with DOE from a regulatory perspective to find an approach that worked for each agency. He noted that the Hanford complex was not built with a regulatory framework in mind, which was a continual challenge. The two agencies would continue working to reach

an agreement on an appropriate response. Project managers were meeting weekly and conversations were moving forward. Should agreement not be reached, Ecology had the authority to initiate an enforcement action under its Hazardous Waste Management Act authority.

On the subject of holistic negotiations, David had little new to report. He expected that mediated discussions would be completed soon. He stated that the parties agreed not to discuss the status during negotiations. TPA negotiations resulted in suspension of 14 TPA milestones that were affected by Congressional appropriations in FY18 through FY21. The suspensions would allow the parties to negotiate new near-term milestones and develop a new path forward for the suspended milestones.

He reviewed Ecology's compliance activities from June to August of that year, which included multiple completed inspections and permit modifications, primarily associated with the Waste Treatment Plant, but consisted of activity across the complex. The agency was slightly behind on its targeted inspection goals. Public comment periods were planned for a series of permit modifications.

David concluded his presentation and called for questions.

Board Questions

Tom Sicilia, Oregon Department of Energy, recalled previous questions about how PRF rubble might assay. He wondered if ERDF was the final disposition site or if that remained to be confirmed. Brian Vance confirmed that the rubble was already at ERDF, the final disposition site.

Richard Bloom, City of West Richland, stated that he understood that a standardized COVID-19 vaccine was offered on-site. He asked if other vaccine options would be available on site and if there were plans to expedite the flu vaccine, as the two vaccines could not be taken together. Brian Vance clarified that the site was offering the Moderna vaccine, as that was offered by the federal government, and that he would need to confirm with the occupational medicine provider regarding flu vaccine sequencing. Brian Stickney contributed that he believed that the COVID-19 vaccine would be prioritized due to the employment eligibility tie, but the flu vaccine would be pushed as well, when available and possible to administer.

Liz Mattson, Hanford Challenge, asked if, based on DOE's updated focus on the Hanford Five-Year Plan, if DOE saw an advantage in HAB modifying its budget priorities advice. Brian Vance stated that he did, believing that the outyears were much more constructive, as those were where DOE had the greatest opportunity to act on and the HAB's best opportunity for positive impact. Liz asked if there was a plan for DOE to cover the Hanford Five-Year Plan at the HAB's October meeting, as it might influence advice timing. Brian Vance expected that timing would work.

Steve Wiegman remarked that the conversation fit well with the HAB's desire to place its focus further in the future and have conversations more directed toward future states of the site. Regarding the permitting and regulatory actions required for startup of the DFLAW system, he wondered if there were any anticipated issues in the critical path and what might be done to expedite the approval process. Brian Vance stated that there was a single integrated schedule that was used to communicate with the team that laid out the upcoming permits such that agencies could communicate with one another and assure that needs were met. He knew that each of the contractors held regular discussions and meetings to ensure that they were aligned with one another regarding permitting needs. Further, these regular discussions allowed foreseen issues to be worked through. Mechanisms were in place at all levels to prevent critical path delays. David stated that, on Ecology's side, the previously discussed recruitment efforts would help to

mitigate delays. David appreciated the coordination and support for his team from other agencies and contractors.

Chris Sutton, Public at Large, asked if Ecology concurred with DOE's statement that B-109 posed no risk to the environment. David stated that, were Ecology in concurrence, it would also agree on how to act and would not need to negotiate the matter. Though they were not in concurrence, Ecology and DOE were working together to find the path forward. Brian Vance clarified that he stated that there was no risk to the workforce and public, while being an incremental insult to the environment. There were already over 50 million gallons of waste discharged to the soil in the area; while not zero impact, it was incremental and comparatively small.

Regarding the Test Bed Initiative (TBI) Waste Incidental to Reprocessing (WIR) draft expected in October, Liz asked if agency representatives could explain what to expect in the upcoming comment period and provide an overview of different phases planned around the TBI. Brian Vance stated that there were basic steps involved, one being the environmental assessment presently underway. When that environmental assessment closes, it would transition to the WIR process, which would have US Nuclear Regulatory Commission (NRC) engagement throughout. The permit would be resubmitted to Ecology after the WIR process. Liz asked about a planned third phase, to which Brian Vance replied that there was no present discussion of a third phase. Steve Wiegman noted that he was on site when the decision was made to regulate the tanks under the Resource Conservation and Recovery Act (RCRA) and that he appreciated the difficulties that DOE worked through on that front.

Liz noted that, in the prior day's Public Involvement and Communications Committee (PIC) meeting, there was discussion about future budget related meetings and lessons learned by TPA agencies. She asked if Carrie Meyer, DOE, could share the highlights of that discussion, as it would be helpful for the full Board to hear. Carrie agreed, explaining that DOE was working to update the Hanford Five-Year Plan, and as part of that, was looking for an opportunity in October to hold a Committee of the Whole (COTW) to share the results, focusing on outyears. DOE hoped that HAB input on FY24, FY25, and FY26 could be packaged for submission as input into the DOE 10-Year Strategic Vision.

Carrie stated that, regarding lessons learned, DOE identified that it did not provide sufficient detail on subprojects in its most recent budget priorities workshop, such as different aspects in achieving the listed priorities. DOE recognized that they could have provided further detail on items that fed into priorities. DOE hoped to create a cyclical input process that would be refined as time went on.

In closing, Steve Wiegman thanked the presenters for their time, stating that he appreciated the updates and candid conversations.

Melter Heat Up

Mat Irwin, DOE, supported by Val McCain, Bechtel, led a presentation on the progress toward melter heat up for the DFLAW project. They led with a visual overview of the DFLAW project (*Attachment 6*), showing the overall waste process flow for the LAW Facility and to show where each DOE contractor contributed to the overall project. Using the diagram, Mat guided the audience from the tank waste source at the AP Tank Farm through processing and disposition at IDF. He noted that Balance of Facilities components were not shown, such as support facilities for processing offgas. He emphasized that the overall integrated management approach across all Hanford Site operations was essential for a successful mission.

Val provided an overview of the "people, plant, and paper" approach. She noted that the team had been working and operating on a 24/7 schedule for a while at that point in preparation for a transition to

operations and made significant strides toward completing DFLAW. More and more facilities were running, and the team was working to make a significant mindset shift among the workforce toward operations. They thought of it in terms of the three Ps: people, plant, and paper.

She explained that “people” referred to staff and hiring efforts; “plant” included the facilities themselves that were proceeding toward readiness; and “paper,” which included the processes and procedures necessary to start up and operate the plant. As the focus shifted toward an operational culture, the three Ps needed to come together.

Val provided further detail on each subject. On the subject of people, she reviewed team building efforts for operations. The team was working to transition the workforce toward operations over the prior two years. There was a skillset change underway, and they were working to ramp up with personnel that would operate the plant. There were 140 commissioning technicians hired that would run the plant. This group was split into four separate crews that would run the plant 24/7. These were staffed from the International Brotherhood of Electrical Workers (IBEW) and were presently undergoing individual and crew training, such as emergency preparedness drills. Additionally, laboratory technicians were brought on from the Pipefitters Local, who would join the chemists working in an offsite laboratory. The first 50 of the planned radiological control technicians, which were staffed from the Laborers Local 348, also started training. Val stated that the training was very rigorous, starting with classroom training and moving to simulator training, drills, and proficiency demonstrations.

She stated that ensuring the three Ps were in alignment was imperative to the necessary worksite culture shift. On the subject of plant, construction for each facility was complete, and all facilities other than LAW had completed system and component testing. She expected that the LAW facility testing would be complete in three to four weeks, which would be a huge step toward overall project completion. Following that, the facility would be handed over to the commissioning and plant management team for full care, custody, and control of those systems and facilities.

Val noted that a virtual tour of the LAW facility was available on Hanford.gov. She showed pictures of the inside of the facility that showed stainless steel containers that would be filled with vitrified waste. These would be moved using remotely operated equipment and moved by trolley.

Val reviewed the third P, paper, which consisted of preparing processes, procedures, and training; specifically, ensuring documentation, procedures, programs, and controls necessary to manage the plant were in place. The team completed the development and finalization of over 5,500 procedures required for operations. Earlier that year, the team started going through validation of procedures to correct and refine them. All operational plans requiring DOE approval were in place. Paper also included permits, which Mat stated were on schedule to be in place before operations began. He felt that the partnership with agencies, regulators, and contractors was good; as complexities and challenges were encountered, all parties worked together to overcome them and move the project forward. Mat noted that peer review was part of the procedure validation process by inclusion of work observation teams that assisted in coaching.

Val explained that, though phenomenal progress was made, there was still a lot to do to bring the project to completion. The little remaining work to be done was anticipated to be the most challenging. Mat provided a visual of Mount Whitney, the largest peak in the continental US to demonstrate the idea. The approximately 90% of the work completed equated to the distance travelled through the foothills of the mountain, concluding at the first melter heat up. The remaining work leading to hot commissioning and operations, however amounted to a vertical climb to the peak of the mountain due to the challenge of getting each of the three Ps to work in unison. The team needed to ensure safety management programs were in place and validate that all systems were working in an integrated fashion. He emphasized that

melter heat up was the point of no return, as it would need to remain in a molten state throughout its life. Val pointed out that, in regard to schedule and people, the team expected that things would be learned about the plant during commissioning. The team would ensure that the people were both ready and proficient, as safety of the workforce was key, and the team would not compromise when resolving discovered issues.

Moving to the process for melter heat up, Mat reviewed the specifications of the LAW melters. The melters were designed under Bechtel's authority and fabricated in Ogden, Utah. Each weighed 300 tons, which were significantly larger than others used across the DOE Complex—nearly five times larger than the Savannah River Site melter. They would be heated to 2,100 degrees F as part of a two-month process, the first month consisting of heat up and testing and the second consisting of performance monitoring. He provided an overview for the process the waste and glass forming material would undergo within the melter. He noted that the system was a joule heater, which worked similarly to a toaster in that current would be applied across the material surface to heat.

In concluding the presentation, Mat asked for questions.

Regulatory Perspectives

Dan McDonald, Ecology, thanked Mat and Val for their presentation, noting that it was very comprehensive. He agreed that they were at a critical turning point in the project. He expected that the nature of the challenges would change as they got closer to completion, and that Ecology would stay engaged as they moved forward. Regarding the idea of contingency and risk management, he stated that it was essential to maintain awareness and be proactive in moving toward operations as they did not want to have to react to a “whoops” scenario. He wanted to preclude potential interruptions as the project evolved. He looked forward to continuation of successes and effective management of contingencies.

Val commented that she thought the partnership and continued dialogue between agencies and contractors was important moving forward, as each had its pieces and parts to manage. She appreciated the comments and wanted to make sure they remained transparent about contingencies and risk awareness. Mat provided examples, such as the use of a simulator for workforce training. In the simulator, workers can react to alarms and emergency response scenarios without interrupting other operations. He expected that, should the team encounter those alarm conditions in the plant, they would have a workforce that is proficient in reacting to those conditions.

Board Questions

Dan Solitz, Oregon Hanford Cleanup Board, asked what plans there were to monitor practices—the “fourth P”—and if there were still “peers looking at peers” being conducted like the World Nuclear Operators Association. Val stated that many agencies and external interdependent experts were included in operational readiness reviews. Mat contributed that, at the worker level, the project had craft safety representatives in the first use validation reviews, which included actually performing the procedures as written and providing feedback, as well as the work observation teams, which had varying team compositions. He was not sure that was called a peer review per se, but peer review was part of a number of the processes.

Shelley Cimon, Columbia Riverkeeper, in considering the process to get to commissioning and startup, she worried about what might not be known or could not be planned for. She hoped to hear more information about redundancy, backups, extra parts, and things of that nature. Mat explained that the system was designed and built with a number of defense layers. This included redundant components

such as multiple chillers, process air compressors, areas of exhaust, and others. Within each system, there were alarm conditions at multiple points. Safety interlocks were built in, and potential loss of systems was planned at all levels. Val noted that as part of the peer review process, a system deep dive was conducted with other experts across the complex to gather and implement their lessons learned from other facilities, which included additional depth in backups and spare parts, additional personnel, and other suggestions.

Shelley wondered about power distribution and ratios and whether the system could support a change in dynamics, such as addition of a new boiler. Mat stated that, among the things Val's team had done was look at different nozzle designs that help support specific boiler flow rates anticipated for DFLAW. Another example included examining where temporary equipment such as air compressors could be hooked it, should the situation demand. He expected that such aspects were being examined as part of the system deep dives Val referred to. Dan McDonald contributed, stating that contingency was only one aspect of risk awareness, and the focus should include process control strategy. Where risk presents itself, it should be set up to ensure that a risk would not result in accumulative anomalies. He noted that Ecology was very aware of such things and consistently pinged the project to ensure they were accounted for.

Michael Korenko, Grant and Franklin Counties, asked what the exclusion zone would consist of during and accident scenario and if it would be marked. Additionally, he wanted to know what the accident communication plan consisted of. Mat explained that the emergency preparedness program for the Waste Treatment Plant was an integrated part of the Hanford emergency preparedness program. For DFLAW, the hazard that could potentially create an emergency scenario that would be a site emergency was an uncontrolled release of ammonia, while everything else would be localized to the plant. The exclusion zone, though he did not know the precise boundaries, was within the site and controlled by Hanford Security. He stated that it probably consisted of a shelter-in-place followed by evacuation, but he would need to confirm per the emergency response plan. Michael followed up, asking if the exclusion zone would limit end state public use. Mat stated that it would not, as an ammonia event would be a transient event.

Chris Sutton asked if there were specific operational events identified that would cause a melter shutdown or a stop to operations. Mat explained that melter standby was anticipated and there were a number of alarm systems that could trigger that. In standby, a melter would remain molten. The only condition that would result in shutdown of a melter would be a multiple-day loss of power, but there were many contingencies in place to mitigate that. It would require a total site power distribution failure event. There were conditions where a melter reached end of life in which it would be decommissioned and replaced.

Chris also wondered if there were sensors that could monitor potential corrosion during operations. He recalled an event at the Fernald Site where waste was planned to be vitrified. Their system was built with international expert support, but it turned out that the elemental composition of the waste and components created and environment were unknown to all involved. Ultimately, corrosion resulted in a hole at the bottom of the melter. Mat stated that small-scale testing that replicated melter conditions were performed successfully. He knew that a number of variables were monitored by sensors but was unsure if corrosion was among them and would need to check on that.

Steve Wiegman thanked Mat and Val for their efforts and remarked that there was a large number of people depending on the success of the project; not only among those represented in the Pacific Northwest by HAB, but at a national level. They depended on the project moving forward in order to move onto whatever came next, as there was not an established plan for how to deal with the rest of the tank waste. He appreciated all the teamwork demonstrated on the project.

Dan Solitz asked about points at which temperature was being monitored and wondered if ideal temperatures for throughput were identified. Mat stated that there were a variety of points across the melter, pour nozzle, and cooling system at which temperature was monitored. Regarding the ideal temperatures, Mat stated that it was a complex equation with many components to consider. He could not state the critical variables as it was based on modelling, but as the project moved into operations those could potentially be identified.

Gerry Pollet, Heart of America Northwest, asked about CO₂ emissions from diesel, hoping to learn total annual emissions and how it compared to regional emissions and Washington State reduction goals. Additionally, he asked if DOE would participate in the state's new emissions trading program for CO₂. Mat stated that he could not speak for total emissions. However, he knew that there was a single diesel generator that was not particularly large. Further, he knew there was analysis and ongoing dialogue on how to address the goal for both the project and site. Val noted that she believed the DFLAW portion to be 32,000 metric tons per year, which was under the Washington State clean air limit. Staci West, Bechtel, confirmed the figure.

Liz asked if the project assessed the potential impacts to staffing due to the federal COVID-19 vaccination mandate. Val stated that it was on the minds of the team, but they were waiting for final direction. She explained that contractors were working to understand the status of the team and that they were gathering attestations. With the assumption of a requirement for full staff vaccination, it would become clearer in the coming months what impacts the mandate would have. She expected there would be impacts, but the team was working through in a manner that respected the workforce as best they could, as the team and workforce were highly-valued. She thought it might require the project to slow down in order to safely advance the mission. Mat noted that, stepping back to telework implementation, the team embraced the situation and accomplished a lot. The team adopted social distancing, mask use, temperature tests, and other precautions at the plant. He felt the team's accomplishments were encouraging when considering the outlook.

Chris asked about the melter design life. Mat confirmed that the melters had a design life of five years, per modelling, but the definitive number would be determined by results in operations. Chris wondered what impacted that model. Mat was unsure, but knew it was evaluated by a number of experts, including Dr. Kruger, who leads melter experiments, as well as tests at Catholic University. Mat confirmed that there would be ongoing changeout efforts. He noted that Savannah River Site discovered a much longer design life in practice than was initially anticipated. His team would not suppose that, but it was a possibility.

Public Comment

Rob Davis stated that he worked on the DFLAW project for years and wanted to assure the Board that the engineering was quality and that it was audited consistently. Prototypes were operated for years to demonstrate that the formulations were effective and successful. He commended the team for its efforts. He noted that the project was intricate, but safety was integrated at all levels. He looked forward to seeing glass canisters discharged from the facilities. Val noted that the team saw support grow over time, which was necessary and appreciated.

Nancy Morris requested that TPA agencies adopt a plan to respond to the leak from B-109 and implement a long-term plan with public input for addressing future leaks.

Tank Leak Assessment Process

Before start of the presentation, Steve Wiegman restated the context of the day's Board meeting. He explained that the meeting was intended to be informational only. There would be no voting because there were a number of important Board members that would be unable to vote. He explained that DOE was not blocking voting on potential advice. He and the vice chair, Shelley Cimon, requested that the Board hold the informational meeting rather than delay meeting altogether.

Gerry Pollet stated that each member of the Board, including those awaiting reappointment, should be asked to provide input on the draft advice. He felt it was important to have a discussion and see where the Board stood on the advice, as the Board was responsible on behalf of the public and members' constituencies to provide advice on events or emergencies such as a tank leak. Steve responded, stating that it was important to hear from members that had something to offer. As time permitted, he planned to do so and move forward on the draft advice when it could be fully discussed by the HAB membership. It would proceed, he just wanted to ensure it was done in a context where the membership was available and able to participate formally in the process.

Stan Branch noted that there was a process in place for membership package approval that was being followed and presently in progress.

Karthik Subramanian, Washington River Protection Solutions (WRPS), provided a presentation on the Hanford Site leak assessment process. He stated the objectives were to review the background of SST B-109 and the tank monitoring and integrity program; provide a technical interpretation of the waste level readings in the leak assessment report; review how the leak volume was calculated; and review mitigation measures.

Karthik explained that B-10 was a 530,000-gallon, underground SST. He noted that tanks across the site are not uniform in size or structure, as many were nearly twice the size at one-million-gallon capacity. The tank received contaminated liquids from operations to produce material for the US nuclear weapons program from 1946 to 1976. All pumpable liquids were removed as part of an interim stabilization effort for SSTs in 1985, resulting in most remaining waste consisting of solid saltcake and sludge, with a total of 123,000 gallons of waste remaining in total. He noted that all the information presented was available in a publicly available tank waste assessment report.

After undergoing a formal leak assessment process, B-109 was declared leading in April 2021 with an estimated 3,100 gallons of waste having leaked. Karthik noted that the leak was small when compared to the existing volume of waste in the soil, and due to the waste previously discharged to that soil, mitigations were already in place.

He stated that the leak assessment was guided by a leak assessment panel, under a process that has evolved and improved over the years. The tank monitoring and integrity program was guided by the *Single-Shell Tank System Leak Detection and Monitoring Functions, Requirements* document, RPP-9937, Rev. 4. As part of those requirements, periodic waste level readings were taken and tank inspections were performed using remote cameras. He reviewed a diagram of the tanks and provided detail on the technologies used in measurement and observation. Karthik explained that the waste in tanks tends to move, and from experience with the tanks, he and his team knew there were multiple factors that could affect the interstitial liquid level (ILL). He noted that the technology utilized has improved over time, such as the cameras used for inspections. Additionally, the site implements a highly conservative dome load program under which the weight load above the tanks is limited. There were engineering controls in

place to limit what was placed on the tanks and periodic measurements of the ground above the tank were taken to track changes in elevation.

Karthik provided an interpretation of the ILL report, showing the ILL within the tank over the prior 24 years. He reiterated that waste moved in tanks for a variety of reasons, so the ILL was never consistent. Reasons could include saltcake collapse, gas movement, or potential water intrusion, but that was not certain in this case. Waste movement could move waste to or away from the liquid observation well, which caused readings to be inconsistent from each measurement taken. When a drop in the ILL reading is followed by a recovery, that indicates typical waste movement, rather than a leak.

With that background provided, Karthik reviewed the events observed from the ILL trends over time. He noted a half-inch decrease in waste observed in 2016 that recovered by the following reading, which indicated typical movement. Later, between December of 2018 and March of 2019 a 1.2-inch decrease was observed without immediate recovery, which prompted an increase in monitoring frequency from quarterly to monthly. However, by early 2020, the waste appeared to have stabilized, which resulted in monitoring to be reinstated on a quarterly basis but was followed by another ILL decrease. At this point, in June 2020, the formal leak assessment process was initiated and monthly monitoring was reinstated. After all data required by the leak assessment process was gathered, concluding with drywell logging right outside of tank B-109, the probability of a tank leak was confirmed. The tank leak was declared in April 2021.

Karthik provided an overview of how the leak volume was estimated. He reviewed the tank dimensions against the estimated composition of the waste, which was approximately 41% sludge and 59% saltcake, excluding supernatant. He showed photos of the waste surface, noting the liquid waste observed on the surface. He noted that liquid was easier to observe when reviewing video and as part of the estimation process. The team reviewed hours upon hours of footage. The saltcake waste porosity was estimated to be 24%, based on the knowledge of the types of waste contained. He explained that the liquid present in the waste was a combination of free liquid on the surface in addition to interstitial liquid.

He explained that the liquid surface fraction could be observed decreasing in the footage available from February of 2014 onward, from approximately 46% liquid surface coverage to less than 5% in February of 2021. In addition to visual inspection, liquid levels were tracked with an installed saltwell screen. All available empirical and physical data were analyzed through several methods that fed into the leak volume calculations, which resulted in an estimated 3,100 total gallons leaked.

Karthik provided a review of mitigation methods already in-place, focusing on a groundwater treatment system capable of pumping six million gallons of liquid per month. The treatment system was designed to capture and remove contamination from under the B Complex that resulted from past operations, including previous B Farm tank leaks. He reiterated that, as a result of the 52 million gallons of contaminated liquids discharged directly to the soils in past operations, in addition to the 360,000 gallons of contaminated liquids resulting from previous leaks, the B-109 leak contributed little comparative volume. The in-place treatment system was capable of handling the additional volume. He noted that subsurface modelling indicated that it would be at least 25 years before liquid from B-109 could reach groundwater located 210 to 240 feet beneath the tank.

Karthik noted that other mitigation measures had been examined and some were already underway. The groundwater treatment system was presently being expanded to include a new extraction well. Ventilation was evaluated as a means to remove water intrusions, which in turn would help prevent further leaking. However, B Farm would require new infrastructure to support that installation. Additionally, installation

of a surface barrier would serve to divert precipitation and help to prevent rain recharge. Those were being installed in multiple tank farms across the site.

An option evaluated was removal of pumpable liquids, however, not only would new infrastructure be required, effectiveness would be limited as the liquid is not readily accessible by a pump. Retrieval and transfer would require a significant investment in new infrastructure. He noted that the Tank-Side Cesium Removal (TSCR) was not a valid option for mitigation as it was neither designed for compatibility with a tank of B-109's dimensions nor compatible with the waste content. In order to make the waste content compatible, significant amounts of water would need to be added to achieve the required chemistry for ion exchange, which was counterintuitive to the goal of removing liquid. He explained that DOE balanced its options against its commitments to the TPA and Consent Decree. The pros and cons of many potential options were examined.

Karthik provided a summary of topics reviewed in closure of the presentation. From the standpoint of SST monitoring, he reiterated, there were documented requirements in place which were taken seriously. The formal processes were followed. Data was tracked and evaluated thoroughly as part of the requirements, and the same processes were followed for B-109. DOE was continuously collaborating with the regulatory agencies to ensure all options were considered and recognized.

Regulatory Perspectives

Nina Menard, Ecology, stated that Karthik did an excellent job in explaining the process, remarking that it challenging to determine a leak. As a regulatory agency, she stated, Ecology is committed to abide by regulations, so allowing a leak to continue without addressing it was outside of the regulations. She remarked on the mitigation technologies reviewed. Based on what she knew of other instances where ventilation was used, it was only useful for removal of surface-level liquids, but ineffective for liquids at the bottom where a leak occurred. While surface barriers were helpful in preventing snowmelt and rainwater intrusion, it would not stop a leak from the bottom of a tank.

Nina explained that the agencies were nearing approval of an interim ROD for two groundwater units under the B Complex, as well as the C and AY Complexes, which would allow expansion of the groundwater remediation systems. However, she noted that past leaks and contaminant discharges were further down in the vadose zone than the B-109 leak. Though she was glad to hear that it would be over 25 years for the contamination to reach groundwater, without action the pump and treat system would need to continue to run for many years.

She agreed that the determination that TSCR was not a viable option was correct, and Ecology's engineering determined such. She hoped to see a viable program to address SSTs leaks, as it was likely a problem that would be encounter more frequently as time went on. She hoped for DOE to work with Ecology in development of a leak response plan.

Board Questions

Gerry Pollet, referencing the ILL graph, noted a period from September 2018 to February of 2019 that represented an approximate four-gallon decrease per day. Stating that the law required immediate reporting of evidence of contaminate release into environment, he asked what amount of evidence it would take for DOE or Ecology to report a leak. Regarding the liquid level increase observed, he explained that Dirk Dunning of Heart of America Northwest determined that the rate of increase was steady over the course of 15 years. As a result, he believed the waste to be hygroscopic, attracting liquid. If Dirk Dunning's calculations were correct, the liquid loss would be two to three times greater than

DOE's estimate. He asked for Karthik to address that, and, if true, if that property was considered in the leak volume calculations. To Nina, Gerry asked if the law required, when a leak occurs, that the tank be emptied as soon as feasible, with no consideration of what other waste was in the area.

Nina stated that, once a leak was confirmed per RPP-9937, Ecology had been negotiating with DOE regarding a means to stop the leak in the tank. She believed the relevant regulation stated a requirement to stop the leak as soon as it was feasible, rather than empty it. She later corrected that statement, stating it required the tank being emptied as soon as it was practical to stop the leak, meaning that enough waste would need to be removed to stop the leak.

Regarding the hygroscopic properties, Nina stated that she spoke with Ecology's head chemist about the matter and that individual did not believe the waste to be hygroscopic. Karthik clarified the matter. He stated that hygroscopic was a very general term for salt and the term that would instead be applicable was deliquescence. He explained that deliquescence was a well-known phenomenon in the tanks, so considerable work was done in studying the potential effects. He explained how deliquescence and subsequent efflorescence would apply to the primary components of the waste. The waste was hygroscopic, but not in all conditions. Regarding the Gerry's initial question, Karthik stated that the team would continue to track the ILL.

Steve Wiegman remarked that he liked the idea of TPA agencies working together on a long-term response plan. He expected that the B-109 was a red flag, indicating that more leaks were to come. He urged the agencies to find a way to move forward, rather than letting the tanks sit there until they all leaked.

Jeff Burright, Oregon Department of Energy, hoped to challenge some of the things that were said. He noted that by comparison of photos taken in 1985 against the video taken in 2014, it appeared that previously dry waste was covered in liquid that was not there previously. To him, that seemed to be confirmation that new liquid was coming into the tank over time. He wondered what the source would be and at what rate it was entering the tank but did not expect an immediate answer.

Regarding a previous statement about TSCR's incompatibility with B-109, Jeff noted a previous mention of salt molarity of the interstitial liquid and how that would result in waste incompatibility with ion exchange resin used with TSCR. However, based on available references and other consultation, Jeff calculated the molar sodium to be within the stated threshold, and as a result, believed that it would be compatible. Further, Jeff stated that it was his understanding that the purpose of the TBI was not about individual tank compatibility, but rather to serve as proof of concept that liquid could be removed from a tank. He asked if there were other ways that it could be treated that might allow an alternate disposal method, such as offsite disposal. The ion exchange resin was a means to dispose of waste in a new container, TSCR being one such container. He wondered if the TBI, as a concept, might lead to a tool to be used in future leak response.

Jeff also wondered, on the front end of the process, what might be done to remove liquid from tanks. He noted previous statements that suggested that it would not be valuable to try to pump tanks that have already been emptied. He felt that, given the change in purpose from interim stabilization to leak response, that the value proposition might be different. He suggested that enhanced saltwell pumping, similar to that used at Savannah River, might be used rather than previous pumping methods. He felt that removing the liquid was particularly valuable, as the liquid was the most radioactive material contained within the tank. He hoped to hear a response regarding the feasibility of liquid removal and subsequent means of handling or disposing of liquid. He noted that HAB's draft advice on the topic was asking for a more formal assessment of options.

Jeff referenced a previous point of the presentation that stated it would take the leaked waste at least 25 years to reach ground water. He asked when the pumps might be shut down or if anyone has considered that question. He also asked if there has been a cumulative risk assessment, considering that there were 3.37 million gallons of leakable liquid across the Hanford Site SSTs.

Karthik noted that the TSCR molarity requirements accounted for more than just sodium; it consisted of a complete analysis of sodium, potassium, and all other competing ions. He stated that was a question that could be further examined. He explained that there were two enhanced saltwell pumping methods used Savannah River: one used many years prior where they removed interstitial liquid for direct disposition and a newer method in which they enhanced their rate of salt blending to feed their treatment processes. He stated there are ways in which Savannah River's processes could be used to improve Hanford's.

Nina provided a response to Jeff's question on the groundwater pump and treat system. She stated that, when considering the current conditions, the system would need to be run for at least 25 years, and probably well past that. She expected that, were there an estimate on their lifespan, it would likely be contained the 200-ZP-1 feasibility study, as that was used to create the ROD that built the water treatment facility. With new contributions potentially being added to the vadose zone, however, she thought it was unlikely that a figure could be stated. She thought it was also likely that the pump and treat systems would likely require replacement or rehabilitation over time, along with the water treatment facility.

Pam Larsen, City of Richland, referenced the figure of 52 million gallons of waste being discharged to the soil. She asked if that was from cascading. Karthik stated that it was not from cascading alone, but rather from all operations taking place in that timeframe, both leaks and intentional discharge. Pam wondered if, from a financial perspective, if it would be worth diverting money from tank waste treatment to address individual tank leaks. She stated that she liked the idea of a leak response "toolbox" and that B-109 was likely an indicator that more leaks would follow. Such a toolbox was necessary to respond in the future, and the issue needed to be considered from a resource management perspective.

Richard Bloom asked when pump and treat operations began and if it correlated with ILL drops. Nina believed the operations were started six to seven years prior was when treatment capacity was added for the B Complex. Richard noted that did seem to correlate. He also noted that there was mixed sampling data available for tanks. He asked how interstitial liquid compared to salt radiologically; when discussing the tank leak, he wondered what was being leaked radiologically, rather than what was being leaked by volume. Karthik stated that the tank contents were primarily chemical in nature with some soluble elements in it. The interstitial liquids would be much more dilute in radionuclides and higher in chemical concentrations than the sludge would be. Richard followed up, asking if the tank was considered high activity by comparison to others on site and if there was an estimation of curie leakage. Karthik stated that it was not, it was high in chemical due to it containing waste from older processes. There was no curie leakage estimate that Karthik was aware of.

Chris Sutton asked for additional detail on the statement of 25 years to reach groundwater, noting that number could change depending on the sensitivity of the model. He wanted to know what the figure specifically referred to, as different constituents would move through the vadose zone at different speeds. Karthik stated that he would need to look into the matter; he was not aware of the level of sensitivity used for the model or which specific contaminants were tracked.

Liz Mattson wondered if the idea of adding tank ventilation to evaporate surface liquid might be something done as a regular maintenance method for all single shell tanks, noting that expecting to rely on groundwater remediation for future leaks seemed like a problematic solution. She hoped to hear additional detail on ventilation methods and wondered if there were any thoughts to contribute on that

subject. Karthik provided additional detail on evaporation and ventilation as they might be applied to a tank. The first part would consist of evaporation, which would result in liquid being sent to an evaporator and returned as a concentration containing less water. There was also the ventilation method in which air would be run over the surface of existing liquid to remove water. He noted limitations to the methods. Nina noted that with active ventilation, there were things that needed to be considered. When evaporating water, other contaminants would be evaporated as well, which required treatment for the air released from the tank before it could be discharged to the atmosphere. She did not believe that would be feasible to apply to every SST.

Michael Korenko stated that he liked the idea of a leak response toolbox but wondered why such a thing had not already been developed. Regarding the groundwater pump and treat, he noted that he was concerned about allowing things to be put into the vadose zone. He wondered if soil flushing might be an option to consider going forward. He felt that pump and treat was a good solution for their lifetimes, but the future needed to be considered.

Steve Wiegman considered what was done during the previous interim stabilization effort, noting that water access points were secured and along with everything else that could be done at the time. He wondered if it might be worth considering a second effort at interim stabilization.

Gerry stated that he heard several excuses for not following the law that day. He stated that the Tank Waste Committee (TWC) observed that gamma borehole logging was highly effective in confirming the presence of a leak. He wanted to know why additional borehole logging was not being done to determine what radionuclides were being released and how quickly they were moving. Additionally, he recalled that DOE released a report that concluded that enhanced saltwell pumping was as effective as ventilation. He noted a previous mention of there being too little cesium being available for TBI, wondering if that might make offsite disposal an option. He noted that the technology that was readily available did not require costly infrastructure. He wanted to know if the cost and viability of such methods had been examined. Karthik explained that viable cesium concentrations for transport were different than those for ion exchange. There had not been an analysis performed to determine if cesium concentrations met safety standards for above ground transportation by mobile tote.

Stan Branch contributed, noted that the TPA agencies were cooperatively working to determine a path forward on B-109, as stated by Brian Vance earlier that day.

Public Comment

Bob Suyama (lapsed HAB appointment, Benton County) thanked Karthik for the discussion. He noted that TWC had requested technical input when the B-109 leak was first acknowledged by DOE. He stated that the lengthy and complex DOE presentation approval process was not able to support the TWC's technical needs during the time-sensitive advice development process. Due to this lack of DOE technical input, the committee had to rely heavily on its committee resources instead. To address time sensitive issues in the future, he stated that he hoped that the HAB and DOE could find an expedited, responsive, and real-time process to answer committee technical questions. He felt that Karthik's input would have been highly valuable at the time.

Rob Davis (lapsed HAB appointment, City of Pasco) noted that, were the Waste Treatment Plant function, as was initially planned by that time, the site would not be facing the leak problem. He asked that the Pretreatment and High-Level Waste Facilities be fully funded. He stated that they were in "risk reduction mode" at that point, so the tank leak should be approached from a standpoint of risk. The leaking isotopes, which were getting through, and which were risks to people needed to be considered. As

an example, there were some cations more receptive than others that might stick to soils. Such properties needed to be understood.

Rob recalled a previous study that examined options for dealing with tank waste. The associated report contained calculations on effectiveness of subsurface barriers. However, he noted that since that 1995 study, many new materials and methods have been developed that could create effective barriers under contamination sources. Rob suggested that the document be reexamined with consideration for new technologies. He believed that, should a 200 square foot barrier be placed under a series of tanks, the risk could be significantly mitigated.

Nancy Morris expressed concern about agency comments on a figure of 25 years before waste reached groundwater. As a concerned citizen, she was looking toward future generations and wanted to understand why that was not being dealt with at the present time. She noted that climate change was advancing faster than predicted, which could influence the tank waste's progression. She felt that many past mistakes were made regarding Hanford's waste issues and that agencies needed to act much more quickly than they were.

Introduction of Tank Waste Committee (TWC) Draft Advice

Jeff Burright provided information that was discovered by the TWC as part of its technical discussions on the draft advice on SST leak response. He reviewed the ILL graph and tank waste photographs shown as part of the Karthik Subramanian's B-109 leak assessment presentation. He explained that, back in 1985, the waste was confirmed to have a dry surface, however, in 2014 water was shown to have covered about 46% of the surface, which subsequently shrunk down to 4% by 2021. Based on the data provided, Jeff estimated that there would be about 10 years before all present leakable liquid exited the tank.

Jeff reviewed the overall SST waste retrieval plan and timing, noting that, per the present sequencing, B-109 would not be retrieved until around the year 2044. That date was dependent on infrastructure and funding availability, he noted. Reviewing a diagram of tank farm placement and associated infrastructure, he noted that the infrastructure that would be required for B-109 tank retrieval was not yet constructed, nor part of the presently planned future construction. For the B Complex farms, DOE assumed that additional tanks would need to be constructed at each farm location in order to flush and recirculate the retrieval water, which would need to be pumped miles to the nearest double-shell tank (DST). All of those aspects contributed to the high cost of retrieval, and as a result, Jeff agreed with DOE's position that it could not be done on short notice.

Jeff posed the question: considering those challenges, what can be done? He reviewed the known contents of the interstitial liquid, noting that the gamma signature suggested the presence of cesium. The saltcake interstitial liquid contained 253 curies of cesium versus 550 curies in the saltcake solid. Jeff emphasized, however, that the waste consisted of approximately 13,000 gallons interstitial liquid and 59,000 gallons of saltcake solid, indicating that the liquid had a significantly higher concentration of cesium. The presence of technetium-99 was also concerning when considering groundwater contamination as it moved quickly and lasted a long time.

Jeff reviewed a previous study that examined several potential methods for interstitial liquid removal. Ventilation and enhanced saltwell pumping scored the highest, though Jeff noted the study did not account for the presence of a leak in their evaluation or scoring. Following the study, Ecology requested those technologies undergo field testing using two SSTs by 2020, which was before the leak was formally known.

The TWC was informed of a DST leak response plan, but there appeared to be no existing leak response plan for SSTs. As a result, Jeff explained, the TWC decided there was a need for thinking beyond B-109 to future SST leaks. The resulting advice suggested that DOE remove leakable liquids from leaking tanks as quickly as feasible; create a Leak Response Plan for the SSTs, with stakeholder input; perform a feasibility assessment for the B-109 leak response; invest in research and development to better and more quickly respond to future SST leaks; sample soil around tanks earlier in the leak assessment process; include Ecology and others in the leak assessment process; and explore options to build retrieval infrastructure more quickly and easily.

Jeff presented a letter, issued after advice began development, showing that DOE and Ecology had already started to take some of the actions contained in the advice.

Steve Anderson was curious about the borehole logs and wondered how often they were looked at or used. Jeff thought it was a good question but did not know.

Steve Wiegman asked, wondered, considering that the TPA agencies were already talking about or taking actions suggested in the advice, if the advice would have impact. He noted that he was mostly interested in reflection from TPA agencies on that question. David Bowen stated that Ecology was a science-based organization and that any advice received would influence how it proceeded. He advised that the HAB move forward with its advice.

Carrie Meyer responded from DOE's perspective. She noted that she had seen many different reports referenced, which she appreciated. The advice as written, and Jeff and Steve Wiegman stated, generally aligned with steps being taken. She felt it was up to the Board to decide if it wanted to pursue the advice. Carrie thought the discussion may be the most beneficial aspect of it, as the data is important to understand along with the work the agencies were doing cooperatively to proceed.

Chris Sutton stated that Brian Vance stressed earlier in that meeting that HAB advice was most useful when focused on topic three to five years into the future, providing DOE enough time to act upon the advice. He suggested that were the advice to move forward, it needed to be focused on things that could be done in the future, such as contingency plans for future leaks, rather than focusing on B-109 specifics.

Pam Larsen stated that, as was already pointed out, the information provided in the day's meeting was not available when developing the advice, which likely meant it needed to be revised. She was not sure she agreed on focusing on topics five years out. She felt that made sense for budget, but not all other topics. She liked the idea of a leak response toolbox mentioned earlier. She thought the advice should be adjusted to be congratulatory, focusing on aspects of the B-109 leak response that were successful, and there would likely be many more leaking SSTs.

Gerry Pollet thanked Jeff for his work in reviewing and compiling the data for the Board. He felt Jeff's presentation and the TWC advice showed that the Board's effectiveness was based on the effort put forth by its volunteer committees. He wanted to consider what was heard earlier in the day's meeting. He felt that Brian Vance's statement that the B-109 tank leak was an incremental insult to the environment was a dismal and disturbing effort to defend doing nothing. Gerry stated that Board members that have been around for a long knew that the Environmental Impact Statement for tank closure contained extensive modelling of what could occur with tank leaks. The modelling showed that contamination pulses were expected for thousands of years, contaminating water well above drinking water standards. He felt the inaction was an affront to the principle of "do no further harm," to which the Board adhered. This SST tank leak was not the first, and he expected that there would be many more to come. He felt the advice

should advance, stating that DOE had to respond, as it still had not heard a commitment from the top levels of DOE.

Liz Mattson pointed out a comment from Bob Suyama, which read: “The primary focus of this advice is to request that the site be prepared to address further leaks in SSTs. Not every potential future leaking tank may be in a situation that we can allow them to leak to the environment and just ignore it. We will see more leaking tanks in the future and need to be prepared to address them.”

Ruth Nicholson suggested that the Board ask the Issue Manager Team that developed the advice to revise and present the results the next time the Board convened.

Chris commented on the background section of the advice, noting that there were three pieces of information that could be powerful when orienting the advice toward the future. They included the graph showing the waste retrieval timeframe; a point made in a previous DOE presentation on System Plan Nine that indicated vitrification was planned for completion in the 2060s; and, if accepting that the B-109 leak would reach groundwater in 25 years, a comparison of that timeframe against System Plan Nine.

Tom Sicilia asked if anything was heard in the days discussion or presentation that might change the advice. Jeff stated that was something he was listening for. He felt that he needed to understand the relative costs of potential actions, which was something that had been asked, but no one had the answer to. When considering the individual points of advice, Jeff felt they still made sense.

Steve Wiegman stated that discussion of tank closure had not been reached, which meant that a means to deal with expected tank leaks needed to be determined. He suggested the advice move forward with any necessary changes that needed to be made.

Public Comment

Tom Galioto (lapsed HAB appointment, Public at Large) noted that he was curious if anything was heard in the days discussion or presentation that might change the advice. He heard sentiment that a leak response plan needed to be documented and issued as soon as possible.

Board Business and Next Steps

Ruth Nicholson noted that there was an October meeting that was initially planned as a new member orientation. She still hoped for the membership packet approval in time to hold the meeting as planned. She listed potential topics for the potential October meeting, which included: new member orientation; action items initially intended for the September meeting; and an overview of the updated Hanford Five-Year Plan. She asked Steve Wiegman if there was any other Board business to cover.

Pam Larsen requested an opportunity to provide an abbreviated national liaison report, which Steve Wiegman permitted. The report primarily consisted of staffing changes within DOE leadership.

Emmitt Jackson, Non-Union, Non-Management Employees, asked if the reported changes would have any impact on the HAB. Pam thought the staffing changes to be beneficial. Regarding budget, she noted that the House of Representatives restored a proposed cut to the DOE Richland Operations Office budget, but the Senate’s decision was presently unknown.

Tom Galioto asked if committee activities would be affected by the delay in membership packet approval or if committee activities would be permitted altogether. Steve Wiegman stated that the answer would need to come from DOE. Ruth noted that the topic would be explored in an upcoming Executive Issues Committee (EIC) call.

Bob Suyama noted that membership appointments of the TWC's leadership had lapsed, leaving TWC with no leadership at all. He hoped for an announcement or resolution after the EIC call. Afterward, he noted that he would need to hold an IM Team meeting to further advice development. Jeff Burright stated that he would schedule the IM Team follow-up meeting.

Steve Wiegman announced conclusion of the meeting.

Attachments

Attachment 1: Deputy Designated Federal Officer Slide

Attachment 2: Meeting Agenda

Attachment 3: Draft Meeting Minutes for Board June Meeting

Attachment 4: Department of Energy Update Presentation

Attachment 5: Washington State Department of Ecology Update Presentation

Attachment 6: Melter Heatup Presentation

Attachment 7: Tank Leak Assessment Process Presentation

Attachment 8: Introduction to Tank Leak Response Advice

Attachment 9: Draft Advice on Tank Leak Response

Attachment 10: Draft FY22 HAB Work Plan

Attachment 11: PIC September 2021 Meeting Agenda

Attachment 12: BCC September 2021 Report

Attachment 13: HSEP, RAP, and TWC September 2021 Reports

Attachment 14: National Liaison Report

Attendees

Board Members and Alternates:

Bob Suyama, Primary (lapsed)	Emmitt Jackson, Primary	Gerry Pollet, Primary
Jacob Reynolds, Primary	Liz Mattson, Primary	Phillip Lemley, Primary
Richard Bloom, Primary	Robert Davis, Primary (lapsed)	Shelley Cimon, Primary
Steve Anderson, Primary	Steve Wiegman, Primary	Susan Coleman, Primary
Susan Leckband, Primary (lapsed)	Tom Galioto, Primary (lapsed)	Amber Waldref, Alternate
Chris Sutton, Alternate	Daniel Strom, Alternate	David Reeploeg, Alternate (lapsed)
Jan Catrell, Alternate	Jeff Burright, Alternate	Marissa Meker, Alternate (lapsed)
Michael Korenko, Alternate	Tom Sicilia, Alternate	

Others:

Brian Stickney, DOE	Dan McDonald, Ecology	Staci West, Bechtel
Brian Vance, DOE	David Bowen, Ecology	Val McCain, Bechtel
Carrie Meyer, DOE	Edward Holbrook, Ecology	Dieter Bohrmann, CPCCo
Gary Younger, DOE	Ginger Wireman, Ecology	Linda Maiden, CPCCo
Geoffrey Tyree, DOE	Nina Menard, Ecology	Abigail Zilar, GSSC for DOE
Gregory Jones, DOE	Ryan Miller, Ecology	Coleen Drinkard, HMIS
Joan Lucas, DOE	Roberto Armijo, EPA	Dana Cowley, HMIS
Mat Irwin, DOE	Earl Fordham, DOH	Gabriel Bohnnee, HMIS
Ricky Bang, DOE	Jill Wood, DOH	Jennifer Colborn, HMIS
Stan Branch, DOE	Tom Rogers, DOH	Patrick Conrad, HMIS
		Stephanie Brasher, HMIS
		Destry Henderson, WRPS
		Karthik Subramanian, WRPS
		Terese Meyer, WRPS
		Simone Anter, Columbia Riverkeeper (pending appointment)
		Maxwell Woods, Oregon Department of Energy (pending appointment)
		Kelsey Shank, theEDGE
		Robert Waldher, Umatilla County (pending appointment)
		Benjamin Caleca
		Brian
		Corey Low
		Daniel Baide
		Debra Kelley

		Dee Gray
		Glyn Trenchard
		Joe Cruz
		John Eschenberg
		John Stang
		Mark Knight
		Meghann Stewart
		Michael Sutey
		Michael Turner
		Miya Burke
		Nancy Morris
		Pam Zimmerman
		Patricia Marlow
		Paul Noel
		Peter Brockman
		Rebecca
		Rebecca Blackwell
		Richard Buel
		Robert C
		Ruben Mendoza
		Sally Smith
		Sharon Fasnacht
		Thomas Teynor
		Tyler Oats
		Vanessa Turner
		Jodi Christiansen, HAB Facilitation Team

		Joshua Patnaude, HAB Facilitation Team
		Olivia Wilcox, HAB Facilitation Team
		Ruth Nicholson, HAB Facilitation Team

Note: Participants for this virtual meeting were asked to sign in with their name and affiliation in the chat box of Microsoft Teams. Not all attendees shared this information. The attendance list reflects what information was collected at the meeting.